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NOTES ON THE EXAMINATION OF A COLLECTION  
OF INTER-GLACIAL WOOD FROM MUIR  
GLACIER, ALASKA.

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AT the solicitation of Mr. Harry Fielding Reid I have undertaken the examination of a small collection of inter-glacial woods obtained by him in the summer of 1892, from the Muir glacier, Glacier Bay, Alaska. These woods were mostly found in place under glacial drift, and there can therefore be no question as to their position.

The buried woods were also accompanied by a number of specimens of living wood from trees found growing at the present time near Sitka. With these living trees were specimens of the leaves that came from them, but unfortunately all the leaves were placed together in a box without numbering, so I had no means of connecting the leaves and wood. The wood has been identified, however, by comparing the internal structure with that of a series of named woods belonging to the Sargent collection obtained for the Tenth Census.<sup>1</sup>

I have also taken the liberty of adding to Mr. Reid's collection a single fine specimen of wood obtained by Miss E. R. Scidmore of Washington, D. C. This specimen, as I am informed by Miss Scidmore, was found protruding from a gravel bank which lay beneath an ice-sheet some seventy feet in thickness, on the eastern moraine of the Muir glacier. As it happens to be the only piece of dicotyledonous wood thus far detected beneath this glacier, it is of particular interest.

LIST OF INTER-GLACIAL WOODS WITH BRIEF MACROSCOPIC  
DESCRIPTIONS.

I. *From the buried forest, Muir glacier.*

This consists of a single piece six inches long and, approxi-

<sup>1</sup> Tenth Census of the United States, Vol. IX. "The Forest Trees of North America."

mately, an inch in diameter, and several smaller fragments, which all appear to have come from the same trunk. The large piece is slightly worn on one side, but the rest of the specimen appears freshly broken, as do the smaller pieces. This wood is very light and is the most metamorphosed of any of the specimens. It can be easily rubbed to powder between the thumb and fingers, appearing in this respect like wood affected with what is known as "dry-rot." There is no evidence, however, of the presence of attacking fungi, and its softness is doubtless due to its prolonged masceration. It is very dark brown, almost black, in color.

As already stated this specimen has been badly changed, so much in fact that it has been impossible to identify it with satisfaction. It is the only one left undetermined.

2. *From the buried forest, Muir glacier.*

A piece evidently cut from near the root, which is 20<sup>cm</sup> long and about 40<sup>cm</sup> in diameter. It is without bark, yet is only slightly abraded. One end is much split and "broomed" as though by action of water. The wood is very hard, and is but little changed.

3. *Found on surface of gravel deposits south of Camp Muir; very abundant.*

A segment cut from a trunk or branch 8<sup>cm</sup> in diameter. It is without bark and bears evidence of having been exposed. The wood is compact and shows little if any change from the normal condition.

4. *From buried forest, Muir glacier.*

A number of small water-worn branches, the largest being less than 2<sup>cm</sup> in diameter. The woody structure is very little changed, being still compact and bright where freshly broken.

5. *From buried forest, Muir glacier.*

This consists of two pieces of bark 20<sup>cm</sup> long and 10<sup>cm</sup> wide, without trace of wood. This bark, which is less than 1<sup>cm</sup> in thickness, is but very little abraded and is indistinguishable from recent bark.

5<sup>a</sup>. *From buried forest, Muir glacier.*

Consists of a piece of bark 18<sup>cm</sup> long, 11<sup>cm</sup> wide and about 4<sup>cm</sup> thick. It is not the least changed by water action and presents the same bright reddish appearance as a piece from a living tree. It is also accompanied by a number of fragments of wood that are very light, yet appear very little changed. The larger piece is riddled by a number of worm holes, showing that the wood had been exposed for a time to the attack of insect larvæ, before being entombed.

6. *A piece of stump on east side of Muir Inlet, near Camp Muir; uncovered only at very low tide.*

A thin chip, evidently cut from a large stump, having a thin bark still closely attached to it. It has been very little changed by the action of the elements.

*A single specimen from under the eastern moraine, obtained by Miss E. R. Scidmore.*

This represents a branch or stem 30<sup>cm</sup> long and about 5<sup>cm</sup> in diameter. A thin bright-colored bark still adhered to most of the piece, while the wood is very little changed, being bright colored and fresh.

The living woods mentioned above were accompanied by only three kinds of leaves, which have been identified as follows: *Picea Sitchensis*, Carr., *Tsuga Mertensiana*, Carr., and *Chamæcyparis Nutkænsis*, Spach.

PICEA SITCHENSIS, CARR.

The tide-land spruce is a tree of very large size, found from Alaska south to Mendocino county, California, not extending more than fifty miles from the coast. The wood is light, soft, straight-grained, compact and satiny. The bands of summer cells are narrow and inconspicuous, and the resin passages are few and obscure. The medullary rays are numerous and prominent. The color of the wood is light-brown tinged with red, but the sap-wood is nearly white.

To this species I have referred Nos. 2, 3, 4, and 5<sup>a</sup>. Of these 5<sup>a</sup> is perhaps the most interesting. It has the annual rings clearly marked, the medullary rays in a single series from three

or four to thirty cells high with an average of about twelve or fifteen. The rays in radial section show the walls to be thickened in an irregular manner as represented in Fig. 1. They are provided with a single row of small oblong pits, about two in the width of each wood cell. The wood cells are broad in the sum-

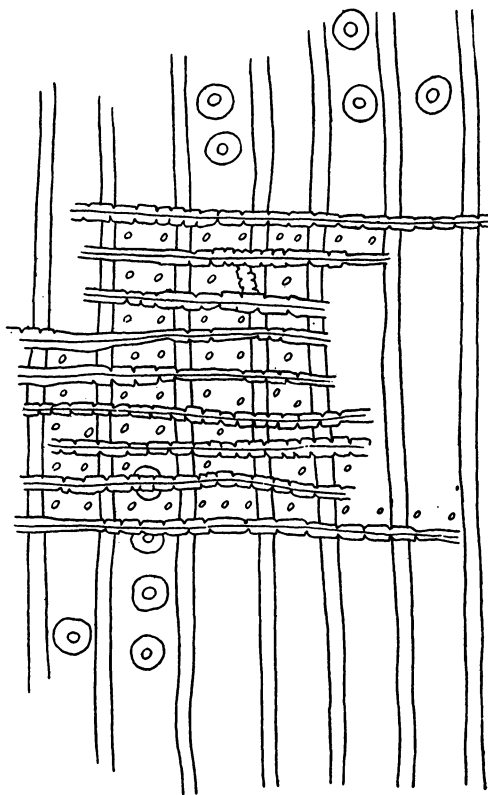


FIG. 1.

mer wood and provided with a single row of contiguous circular pores with a round or oblong inner pore.

This specimen is without doubt the same as that determined by Professor F. H. Herrick<sup>1</sup> who has so accurately described it that it is unnecessary to go further into its description.

<sup>1</sup>Nat'l Geogr. Mag. Vol. IV. 1892, pp. 75-78. Figs. 4, 5.

As stated under the macroscopic description of No. 5<sup>a</sup>, it was accompanied by a very thick piece of bark which agrees in every particular with that of the living tree. It is bright-colored and unchanged.

No. 3 is undoubtedly the same as 5<sup>a</sup>. It has the medullary rays a little smaller and an occasional resin-duct.

Nos. 2 and 4 do not offer differences of particular account.

*TSUGA MERTENSIANA*, CARR.

This hemlock is a large tree extending from Alaska south along the islands and coast of British Columbia and thence along the Cascade Range to southern Oregon. The wood is light, hard, close-grained but not strong, with bands of small thin summer cells and numerous prominent medullary rays. In color the wood is light brown, tinged with yellow, with the sap-wood nearly white.

Nos. 5 and 6 are referred to this species. Of No. 6 the small piece submitted has the thin close bark of a branch of hemlock. The medullary rays are two or three to six or eight (or exceptionally twelve) cells high. The annual rings are clearly demarked; the wood cells have a single row of rather small pores with perfectly circular inner pores. In radial section the rays appear simple, that is the walls are straight and not unevenly thickened as in *Picea*. The walls of the rays have small round pits.

The thin bark (No. 5) described above belongs with little doubt to this species, and I have so regarded it, but in absence of samples of the wood for comparison it cannot be positively stated.

*CHAMÆCYPARIS NUTKÆNSIS*, SPACH.

The yellow cypress, yellow cedar or Sitka cypress is also a large tree ranging from Sitka south through the Coast Ranges to Oregon. The wood is light, brittle, very close-grained and possesses an agreeable resinous odor. In color the wood is bright, light clear yellow, with thin nearly white sap-wood.

None of the inter-glacial wood obtained by Mr. Reid has appeared to belong to this species, although it is possible that No. 1 may represent it.

ALNUS RUBRA, BONG.

This species, the common alder of the region, is a comparatively large tree with light, soft, close-grained satiny wood, which is light brown tinged with red in color, the sap-wood being nearly white.

The specimen described above that was obtained by Miss Scidmore, is referred without hesitation to this species. It is so little changed that it might be mistaken for a recently grown example.

F. H. KNOWLTON.

U. S. Geological Survey.